

What is claimed are:

1. A method of forming an oxynitride film, comprising the steps of:

loading a silicon substrate into an oxidization furnace;

5 implanting an oxygen based source gas into the oxidization furnace to grow a pure silicon oxide film on the silicon substrate;

blocking implantation of the oxygen based source gas and implanting an inert gas to exhaust the oxygen based source gas remaining within the oxidization furnace;

10 raising a temperature within the oxidization furnace to a nitrification process temperature;

stabilizing the temperature within the oxidization furnace;

implementing a nitrification process for the pure silicon oxide film by implanting a nitrogen based source gas; and

15 stopping implantation of the nitrogen based source gas and rapidly cooling the oxidization furnace while implanting the inert gas into the oxidization furnace.

2. The method as claimed in claim 1, wherein the nitrogen based
20 source gas is a NH_3 , N_2O or NO gas.

3. The method as claimed in claim 2, wherein when the nitrification process is implemented, Ar or N_2 is implanted along with the nitrogen based source gas.

4. The method as claimed in claim 1, wherein the nitrification process temperature is a temperature at which a viscous flow of a SiO₂ film may happen and the nitrification process is implemented at a temperature that
5 is higher than the temperature at which the viscous flow of the SiO₂ film may happen in order to relax stress occurring when nitrogen is implanted into a Si-SiO₂ interface.

5. The method as claimed in claim 1, wherein the nitrification
10 process is implemented at a temperature higher than 800 °C.

6. The method as claimed in claim 1, further comprising the step of implementing an annealing process of precluding implantation of the nitrogen based source gas and raising the temperature of the oxidization
15 furnace to a temperature higher than the temperature at which the nitrification process is implemented while implanting an inert gas into the oxidization furnace, before the step of cooling the oxidization furnace after the nitrification process is implemented.